



THE  
**FOOTPRINT**  
COMPANY

BUILDING SOLUTIONS FOR ONE PLANET

# SOPA Ferry Wharf Project

## Sustainability Development Application Report

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<b>Report No:</b>	00	<b>Revision:</b>	2	<b>Date:</b>	03.02.14
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<b>Revision</b>	<b>Description</b>				<b>Date</b>
1	Draft for Comment				03.02.14
2	FINAL				5/2/14
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## 1. Executive Summary

This report outlines the ESD strategy to be adopted for the development and the scope of possible initiatives for adoption to achieve the project sustainability goals. This report is structured to provide an outline of the overall rationale to the strategy and then provide narrative on the design approach to date and the possible initiatives under nine key headings.

The architectural drawings incorporate a “sustainability key” to assist with the appreciation of the physical responses to the sustainability strategy incorporated into the design to date.

The following minimum regulatory requirements apply to the project, which comprises predominantly of residential apartments, with additional public and retail space;

- BASIX for the residential components
- NCC Section J for all areas.

In addition to these regulatory compliance requirements, the project is committed to providing a leading sustainable development, in its design, construction and operation. To that extent the strategy proposed provides a holistic design solution that reduces the total environmental impact of the development and supports SOPA’s vision of a leading sustainability outcome.

These objectives will be addressed and assessed throughout the design process using the following tools;

- Life cycle Ecological and carbon footprinting and
- Green Star retail (required by SOPA development controls).

The proposed strategy is founded on a discipline of quantification and life cycle evaluation with a commitment to continuous disclosure and engagement with SOPA and the future community of residents, tenants and visitors.

## 2. Introduction

This report outlines the key ESD strategy and initiatives for the proposed development which is committed to exceeding typical environmental performance. The project team will utilise a number of tools to provide a holistic sustainable design encompassing all areas of sustainable design, while achieving compliance with standards.

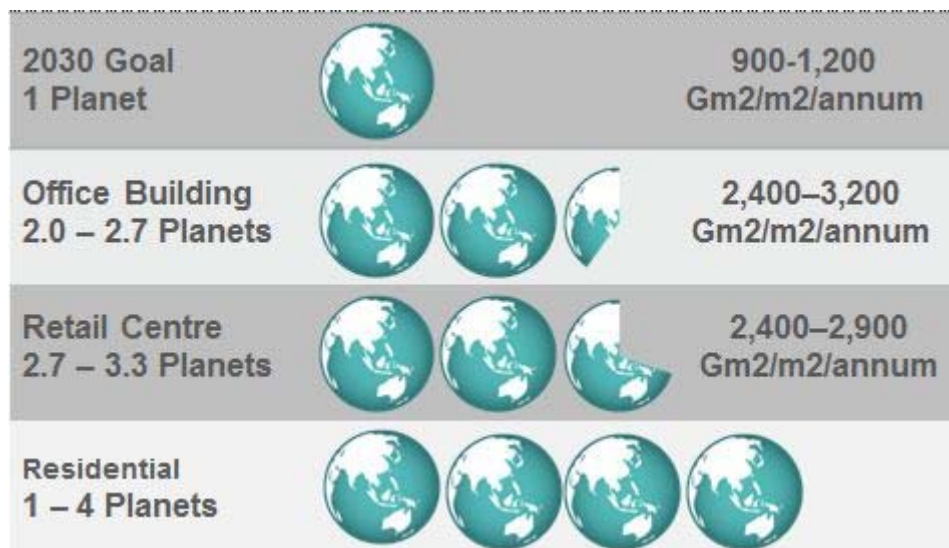
The strategy incorporates a comprehensive reporting, communication and engagement plan. The objective of which is to provide validation to the sustainability investments and features adopted in the design. In addition, it demonstrates the commitment by the developer to growing the sustainability capacity of future owners, occupants and building managers.

### The Sustainability Gap

In the last decade increasing environmental building regulation has resulted in an improvement to the overall impact of development. However, the scale of impact remains unsustainably high. To achieve sustainability the whole development must be considered. Relationships exist between base buildings and their occupants which drive impact. Optimisation is most effective when considered as a whole over the life cycle.

The figure below provides a general indication of the sustainability gap which exists across various asset classes. It is important to consider that to return humanity to ecological surplus it is desirable to deliver buildings with an impact of less than one planet.

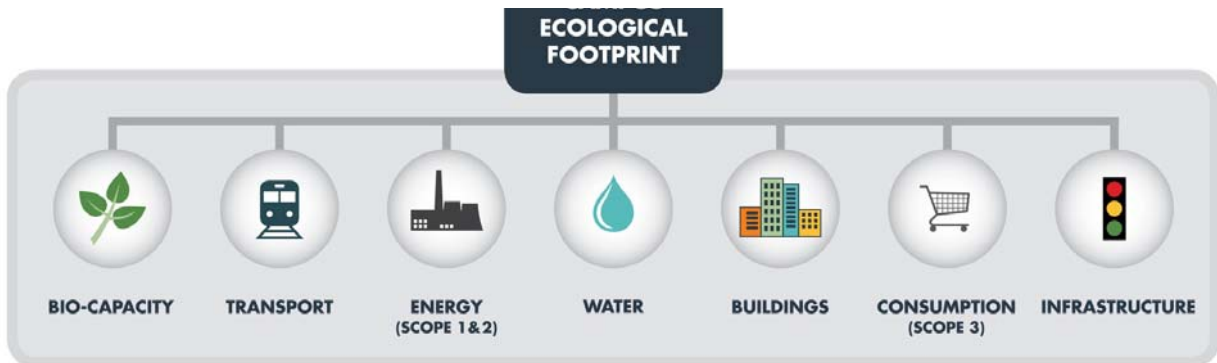
**The Sustainability GAP**



The goal of the evaluation commitment is to quantify the anticipated life cycle Carbon and Ecological Footprint of the building, fitout and operation requirements for the development.

The scope of property related assessments includes : land, base building built-form, tenant fitout as well as transport, water and energy consumption. The figure below provides a summary of the impact aspects considered and also a sense of their overall importance to the total Ecological Footprint of a built asset.

**Footprint Impact Aspects**



The design team has adopted an integrated approach, founded on the low footprint design hierarchy which has secured a solid foundation of efficient and ecologically efficient design. A sustainability key has been incorporated into the architectural DA set which highlights the integration of key design features.

- A design with the least amount of material per square meter to achieve the required functional outcome
- A lighter (i.e. less dense or thinner gauge) material with the same functional outcome
- High recycled material content
- Alternative composition which avoids the need for finishing during service
- An alternative which is demonstrated to have a lower embodied carbon content
- Consider challenging the life cycle or durability needs of an element
- Design the element with the view to the simplest and lowest impact replacement.

**Low Footprint Design Hierarchy**



## Background to Ecological Footprint

The Ecological Footprint calculates humanity's demand on nature and communicates it tangibly in terms of hectares per person (or Planets) – giving an understanding of how much we have, how much we use, and who uses what.

The method was developed in the 1980's with its origins in the question of how many people the earth support at a given level of consumption. Ideally, global resources would be used at a sustainable rate enabling humanity to live within the means of One Planet. Turning resources into waste faster than waste can be turned back into resources drives global ecological overshoot, which means depleting the resources on which human life and biodiversity depend.

Today humanity uses the equivalent of 1.5 planets to provide the resources we use and absorb our waste. This means it now takes the Earth one year and six months to regenerate what we use in a year. Moderate United Nations (UN) scenarios suggest that if current population and consumption trends continue, by the 2030s, we will need the equivalent of two Earths to support us each year against a fixed supply of one.

To achieve a sustainable state individuals and institutions must begin to plan in recognition of ecological limits. This means investing in technology and infrastructure that will allow us to operate in a resource-constrained world. It means taking individual action, and creating the public demand for businesses and policy makers to participate.

It is used by a broad variety of governments, businesses and organisations interested in understanding the factual basis of their policies, buildings, fitout, operations and products. The capital formation and operation of the built environment accounts for up to 40% of total consumption, as such it is essential that we understand the impacts to enable informed decision making about design and consumption choices.

Using tools like the Ecological Footprint to support decision making is essential for success and understanding how much nature we have, how much we use, and who uses what is the first step, that will allow us to track our progress as we work toward our goal of sustainable, one-planet living.

The Ecological Footprint is an objective methodology used to quantify and report impacts of economies, businesses, buildings and their individual products. It is based on International Footprint and Life Cycle Assessment Standards providing confidence in its validity and robustness. It provides quantitative estimates of life cycle impact associated with land use; materials; transportation; energy and water use.

Ecological footprint results are reported in terms of global hectares or global meters square per square meter of functional area. These units represent the physical area of productive land theoretically required to support the capital formation and operational needs of a population, product, organisation or service. When expressed in terms of Planet Equivalents, it means that if all buildings, activity or fitouts were built and operated in the manner proposed, then it would equate to approximately number of Earth's of productive area as indicated in the report.

The most important issue to consider is that the number of Planets is a general and global indicator of the relative sustainability of a facility. The absolute impact of the facility (as reported in global hectares) is a more important measure as it provides a sense of the full scale of impact of the facility. The number one objective of any project is to minimise as far as possible the absolute ecological footprint.

Assessments executed within this calculator are consistent with the requirements of the following standards;

- Ecological Footprint Standards, 2009;

- International Standards Organization ISO 14040-49 (current editions) Life Cycle Assessment;
- Greenhouse Gas Protocol – Product Life Cycle Accounting and Reporting Standard
- Publicly Available Standard PAS 2050:2008.

### **Green Star Retail**

Green Star is sustainability assessment point scoring tool which compares the environmental features of a building to a reference building over a range of environmental considerations.

The Green Star retail tool is used for whole retail buildings which typically stand substantially alone. Due to the embedded nature of retail in this development, negotiations with the Green Building Council of Australia (GBCA) will determine the projects eligibility to be rated under Green Star.

SOPA development guidelines require a retail rating and the project is committed to targeting as many features of the rating as is possible given the development nature of the retail component. Given the nature of the retail component, many points are not applicable.

Appendix A provides a summary of the rating aspects being investigated for their inclusion in the project. This appendix provides a summary of possible targeted points, and identifies those which are not applicable to the development.

### **BASIX**

Residential developments in NSW must comply with the requirements of BASIX which has the objective of increasing the design environmental efficiency for energy and water use. The objectives of BASIX are relative to an average development in NSW and the targets for the SOPA Ferry Wharf Project can be seen below;

- 40% reduction in water consumption;
- 20% reduction in greenhouse gas emissions; and
- Exceed minimum thermal performance requirements for heating and cooling loads.

Due to the integrated nature of the project design to date, many passive design principles have already been embedded and operational requirements will be incorporated to be consistent with strong outcomes consistent with the project leadership vision and SOPA aspirations.

Reference should be made to the Northrop BASIX assessment report.

### **NCC – Section J for Energy Efficiency**

The objective of Section J is to reduce Greenhouse Gas (GHG) emissions in new building works. The National Construction Code (NCC) Section J sets minimum energy performance requirements covering air-conditioning, ventilation, lighting, power and hot water, as well as building fabric considerations including thermal construction and insulation, building sealing, glazing and shading.

The retail portions of the development will need to comply with Section J for Energy Efficiency.

### 3. Strategy and Possible Initiatives

In addition to meeting the defined compliance requirements for sustainability, Payce are committed to the objective of enabling the community of residents and retailers the tools to maintain and enhance the sustainability performance of the development overtime. The project vision is to create a lasting ripple effect beyond development through a leading governance model which will ensure an adequate transition of knowledge from the development team to community and property managers as well as the Body Corporate. This will include hardware (advanced metering and dashboards) and software (training and targets) to maximise the likelihood of success.

The overall strategy of leading outcomes will be delivered via a disciplined approach of life cycle assessment to evaluate the overall environmental benefit of a range of initiatives across nine key sustainability factors. The outcomes of these will be communicated to SOPA on a continuous basis through the design and development period.

The table below shows how the proposed strategy goes beyond SOPA minimum compliance requirements.

**Project Sustainability Strategy Coverage**

Aspect	Ecological Footprint	GreenStar	BASIX	SOPA EG 2008
Land Use	Yes	Yes	<b>No</b>	Yes
Energy	Yes	Yes	Yes	Yes
Water	Yes	Yes	Yes	Yes
Materials	Yes	Yes	No	Yes
Transport	Yes	Yes	No	Yes
Food	Yes	<b>No</b>	<b>No</b>	<b>No</b>
Goods/Services	Yes	<b>No</b>	<b>No</b>	Yes
Retailers	Yes	<b>No</b>	<b>No</b>	Yes
Community Action	Yes	<b>No</b>	<b>No</b>	Yes
Social Engagement	Yes	<b>No</b>	<b>No</b>	Yes

#### 1. Monitoring and Reporting

Key initiatives to be investigated and resolved include; an operational transition program for building and strata managers; on-going sustainability and financial reporting and monitoring; residents induction pack. This program will build on the success demonstrated by Payce at The Waterfront and potentially link together to spread engagement and outcomes.

The project team will provide continuous structured disclosure to SOPA on the outcomes of assessments to communicate outcomes and to support the future goals of SOPA. Outcomes will be presented so as to demonstrate how the outcomes support SOPA “leading” performance aspirations.

#### 2. Water Footprint

A key challenge for the project is the inclusion of retail and extensive green spaces both of which are water intense. A key commitment of the project is the extension of water efficiency to retailers as well as integration of water monitoring into the building dashboard system. Even the most water efficient design can perform poorly in absence of the right monitoring – this project addresses this issue to maximise the potential for the community to maintain a low water footprint into the future.

The focus will be on avoiding water consumption by all possible means – including all water fittings and equipment will be most efficient available and an investigation into the optimal water pressure will aim to balance quality with footprint. A comprehensive review of water sourcing will be implemented with SOPA to ensure the most ecologically and financially solution is delivered for the site and its immediate surroundings.

Maintaining water quality in operations is an essential item and will be achieved through WSUD in external and public areas as well as ensuring bin and car wash bays are addressed carefully to avoid contamination of storm water. Residents and the community will be engaged through the use of creative design of features including landscaping, storm water drains and gutters

Key Decision Aspiration	Strategies to Investigate
Maximise water efficiency and recycling to deliver the lowest operating cost possible.	Residential private space <ul style="list-style-type: none"> <li>▪ High efficient fittings and equipment</li> </ul>
	Residential Common / Public <ul style="list-style-type: none"> <li>▪ Storm water drains linked to ecology</li> <li>▪ WSUD</li> </ul>
	Retail & Community <ul style="list-style-type: none"> <li>▪ Retailers to have water efficiency for all fittings</li> <li>▪ Address use of water on site for green walls and roof</li> <li>▪ Review the need for dual pipe and use money for other initiatives given the current termination of recycled mains at The Waterfront.</li> </ul>

### 3. IEQ

Indoor Environmental Quality (IEQ) affects occupant amenity and comprises thermal comfort, indoor air quality, views, daylight, visual and acoustic quality. These factors are outlined below with respect to the development application, and will be developed further during detailed design.

Key Decision Aspiration	Strategies to Investigate
Provide superior comfort levels.	Optimise solar orientation for living areas
	Maximise passive ventilation
	Optimise thermal and acoustic insulation levels

### 4. Operating Energy and Carbon Footprint

Every aspect of design and operation will be touched by the goal of the lowest possible carbon footprint and highest energy efficiency. The Project aspires to deliver financial and ecological security for residents, SOPA and importantly all retailers and tenants.

The passive design values of the site have been maximised through building orientation and shape delivering a significant early advantage to the achievement of the project goal. Maximising the thermal efficiency of the envelope at the lowest embodied carbon footprint will be a priority, while retail space has been designed to reduce the need for comfort conditioning.

The design and specification of all energy consuming fittings, features and equipment will be carefully planned with a view to selecting future proof technology. The use of building mounted solar thermal collectors will be modeled to validate the life cycle ecological efficiency of centralised system for the site including for retailers to tackle what is the largest carbon footprint of residential and food tenancies.

The overall vision is for a smart building where a low carbon operational footprint are considered and provided for. A key commitment is involving people through the implementation of a building monitoring system linked to public dashboards which will provide information to all stakeholders on the sustainability performance. In addition, modelling will enable a critical sustainable operations plan to be implemented and potentially link performance to building managers contracts.

Key Decision Aspiration	Strategies to Investigate
Every aspect of design aims to be as energy efficient as possible – deliver the lowest operating cost.	<b>Residential private space</b> <ul style="list-style-type: none"> <li>▪ Maximise passive ventilation design to towers</li> <li>▪ enhanced features and fittings in apartments</li> <li>▪ LED standard everywhere</li> <li>▪ Consider the most efficient DHW system including solar boost and heat pump technology.</li> </ul>
	<b>Residential Common / Public</b> <ul style="list-style-type: none"> <li>▪ Everything on PIR sensors in public space</li> <li>▪ LED everywhere</li> <li>▪ Public lighting LED and minimum numbers of light types</li> <li>▪ Building dashboard in lifts &amp; public area to engage on outcomes</li> </ul>
	<b>Retail &amp; Community</b> <ul style="list-style-type: none"> <li>▪ Retailers to use eco-footprint and energy calculator for design as part of lease</li> </ul>

## 5. Waste

The overall goal is to eliminate waste as far as possible through the life cycle of the project. Too often, waste avoidance is only considered for construction with little thought to operational management and engagement of occupants, visitors and residents.

The community impact of poorly managed construction sites is high, so strict requirements for contractors to manage to best-practice levels is a key commitment. Avoidance through the construction phase will be achieved through careful selection of materials and packaging. A comprehensive “close the loop” on waste during operations will be developed with the goal of increasing re-cycling and avoiding waste.

Initiatives already embedded in the design include:

- a dedicated “re-use” room in a basement area where residents can place moving boxes in a manner to facilitate re-use by other residents.
- Three bin solution.

Management of container recovers if a deposit is introduced into NSW and which could be a source of revenue for the body corporate. A composting facility for green and food waste re-use on site for landscaping care. Waste requirements will also extend to retailers and be part of the recognition

program.

Key Decision Aspiration	Strategies to Investigate
Close the loop on waste	Construction <ul style="list-style-type: none"> <li>Design to eliminate waste (e.g. packaging)</li> <li>Design to maximise use of re-claimed ; re-cycled materials</li> </ul>
	Residential private space <ul style="list-style-type: none"> <li>Design kitchen space for 3 bin solution Residential Common / Public</li> <li>Review potential for composting facility on site or a one bin solution to be contracted</li> <li>Integration of reclaimed materials in design Retail &amp; Community</li> <li>Community engagement on recycling – part of community network</li> <li>Composting of food for community garden</li> <li>A “charity” recycle bin</li> </ul>
	Engage residents in management of waste/composting food linked to gardens / green spaces

## 6. Biodiversity

The sites current green space will be lost to the development therefore the goal is to investigate all measures to reinstate ecological value through the use of green walls, roof and planted areas. Climate modelling of the buildings will be used to inform optimal location of planting to maximise its health and productivity as well as contribute to a comfortable environment for people and residents throughout the year. Species selections and structural complexity will build those in the adjacent restored Parklands.

The potential for a community / retailer garden as a feature of the landscape will be investigated and linked to the waste program.

Key Decision Aspiration	Strategies to Investigate
Enhance local habitats	Integrate green space design with food and local endemic species to support and or enhance local biodiversity values.

## 7. Food

Key Decision Aspiration	Strategies to Investigate
Engage community on waste to food at the building level and build social networks.	<ul style="list-style-type: none"> <li>Consider opportunities for community garden (similar to Victoria Harbour)</li> <li>Engage retailers / leasing team in offer with a sustainable focus</li> <li>Investigate potential for green / compostable food process on site for landscape maintenance</li> </ul>

## 8. Transport

Research suggests that a diverse retail offer in close proximity to residential areas positively correlates with reduced car use for shopping trips. The site is in a unique location to leverage this principle and engage with residents and retailers on measures to avoid car use.

The construction and operation of car spaces in buildings has a significant footprint and so elimination of spaces has a positive impact on materials and energy footprints. Physical infrastructure could be paired with a green travel plan – the components of which would be investigated but may include; a car and or bike share scheme; enhanced bike parking; retailer engagement on delivery options and rewards for non-car use (as was used at Rouse Hill Town Centre) will be reviewed with the goal of extending these too adjacent apartments.

Key Decision Aspiration	Strategies to Investigate
Enable a smart / green travel community	<ul style="list-style-type: none"> <li>▪ Investigate a resident green travel plan</li> <li>▪ Consider Car-share on site (leverage local intranet) OR opt in for parking</li> <li>▪ Integrate bike parking in public areas</li> <li>▪ Enable other non-car transport alternatives.</li> </ul>

## 9. Materials Footprint

Materials account for approximately 30% of the ecological footprint of buildings and quantifying the benefits of selections difficult. A key commitment is to quantify and report the embodied footprint of the materials of the project and the reduction achieved through a focus on recycled material re-use, low footprint design and materials.

The aspirational goal is to reduce materials footprint by at least 30% over the reference case . In addition tenants will participate in an ecological footprint assessment of their designs. Every opportunity to creatively incorporate recycled / re-claimed materials into the design will be investigated with the goal of a design outcome which engages and informs residents and the community that good design can be achieved with non-virgin materials.

A particular focus could be on the public realm and the potential of an eco-recognition program for retail fitouts will be investigated as a means of directly engaging retailers and customers in the benefits of low footprint design.

Key Decision Aspiration	Strategies to Investigate
Demonstrate low footprint for materials and optimise recycled / reused materials.	<ul style="list-style-type: none"> <li>▪ Target key built-elements with re-claimed materials</li> <li>▪ Maximise recycled content in all materials</li> <li>▪ Target the lowest footprint material options possible for all elements</li> <li>▪ Use a lightweight approach to design to reduce ecological footprint</li> <li>▪ Tenants to undertake on-line ecological footprint assessment of design and meet benchmarks</li> </ul>

#### **4. Appendix A – Green Star Possible Point Score**

## SOPA Ferry Wharf - Green Star Retail Centre Scorecard



**Version: v001 - Date: 04/02/2014 - Tool: Green Star Retail Centre v1 - Prepared by: SR**

**Important Definitions:** Gross Lettable Area (GLA) = The floor space contained within a tenancy at each floor level as defined in Section 3 of the PCA's 'Method of Measurement for Lettable Area'. Gross Floor Area (GFA) = The total floor area of all parts of the building that are permanently covered and can be protected from the elements. Car parking is not included in the GFA.

**Eligibility:** We note that the proposed retail development is not eligible for formal rating under the Green Star Retail Centre v1 Rating Tool. This Scorecard is to be used for the purposes of an informal aspirational rating only, to ensure the inclusion of sustainability design initiatives in accordance with the Green Star framework. The project does not meet the Spatial Differentiation or the Space Use Eligibility Criteria for the following reasons: the retail centre is a project component and not distinct from the development as a whole; and, there are no common conditioned mall areas.

Credit	Credit Name	Available	Targeted	Credit Approach	Comments
<b>Management</b>					
MAN-1	Green Star Accredited Professional	2	2	A Green Star Accredited Professional (GSAP) has been engaged to provide sustainability advice from the schematic design phase through to construction completion.	GSAP has been engaged.
MAN-2	Commissioning Clauses	2	2	Comprehensive pre-commissioning, commissioning and quality monitoring are contractually required to be performed for all building services (BMS, mechanical, electrical and hydraulic) in exact accordance with CIBSE or ASHRAE Commissioning Codes. The design team and contractor are required to transfer project knowledge to the building owner/manager through all of the following: documented design intent; as built drawings; O&M Manual; Commissioning Report; and, training of the building management staff.	May be additional commissioning scope for sub-contractors. Confirmed by Payce/Ionic 18/12/13. To be integrated with facilities management of base building.
MAN-3	Building Tuning	1	0	After handover, the building owner implements tuning of all building systems; A relevant member of the design team is involved in the tuning process; Monthly monitoring is undertaken and the outcomes are reported to the building owner quarterly; Full re-commissioning is undertaken 12 months after practical completion; and, A Building Tuning Report on the outcomes of the tuning process is provided to the building owner and made available to the design team.	Not currently targeted due to small amount of base building mechanical plant, benefit would be very minor. All tenancies are cold shell fitouts.
MAN-4	Independent Commissioning Agent	1	0	An Independent Commissioning Agent has been appointed to: Provide commissioning advice to the building owner and the design team; and Monitor and verify the commissioning of all building systems.	Not currently targeted due to small amount of base building mechanical plant, benefit would be very minor. All tenancies are cold shell fitouts.
MAN-5	Building Guides	2	2	A simple and easy-to-use Building Users' Guide, which includes information relevant for the building users, occupants and tenants' representatives, is developed and made available to the building owner. A Tenancy Fitout Guide is developed which, through practical recommendations, encourages the use of ESD principles in tenancy design, fitout and operations.	Prepared by the GSAP with input from the project team. To be integrated with facilities management of base building.
MAN-6	Environmental Management	2	2	The contractor implements a comprehensive, project-specific Environmental Management Plan (EMP) for the works in accordance with Section 4 of the NSW Environmental Management System Guidelines 1998; and, The Contractor has valid ISO 14001 Environmental Management System (EMS) accreditation prior to and throughout the project.	Contractor obligation in tender documentation. Confirmed 18/12/13.
MAN-7	Waste Management	2	2	The contractor implements a Waste Management Plan (WMP), retains waste records and submits quarterly reports to the building owner; and, 80% (by mass) of all demolition and construction waste is re-used or recycled.	Contractor obligation in tender documentation. Confirmed 18/12/13.
MAN-8	Waste and Recycling Management Plan	2	2	One point is awarded where there is a comprehensive Waste and Recycling Management Plan for the reduction in the amount, by weight, of the retail centre's overall operational waste. An additional point is awarded where waste storage facilities are provided that meet the general, space, access, amenity and management requirements for retail premises of 'Policy for Waste Minimisation in New Developments' (NSW, 2004).	To be integrated with whole development waste strategy. Confirmed 18/12/13.
MAN-9	Building Management System	1	1	An electronic Building Management System (BMS) is integrated with the building to: Monitor and report on energy and water consumption; and Monitor and control building services systems.	BMS is to include Base Building Retail Centre services. Retail tenancies to be metered. Confirmed 18/12/13.
Sub-Total		15	13		
Weighted Sub-Total		10.0	8.7		
<b>Indoor Environment Quality</b>					
IEQ-1	Ventilation Rates	na	na	As 'open air mall' areas make up more than 95% of the project's total common areas, this credit is 'Not Applicable' and is excluded from the points available used to calculate the Indoor Environment Quality Category Score.	Not applicable.
IEQ-2	Air Change Effectiveness	na	na	As 'open air mall' areas make up more than 95% of the project's total common areas, this credit is 'Not Applicable' and is excluded from the points available used to calculate the Indoor Environment Quality Category Score.	Not applicable.
IEQ-3	CO2 Monitoring and Control	na	na	As 'open air mall' areas make up more than 95% of the project's total common areas, this credit is 'Not Applicable' and is excluded from the points available used to calculate the Indoor Environment Quality Category Score.	Not applicable.
IEQ-4	Daylight	1	1	30% of the nominated area (common areas, excluding car parks) has a Daylight Factor of at least 2.5% as measured at the floor level under a uniform design sky.	Excludes tenancies - i.e. only applicable to mall common areas and circulation areas. The common area is an open air mall. Calculations to be hand calcs.
IEQ-5	Thermal Comfort	na	na	As 'open air mall' areas make up more than 95% of the project's total common areas, this credit is 'Not Applicable' and is excluded from the points available used to calculate the Indoor Environment Quality Category Score.	Not applicable.
IEQ-6	Hazardous Materials	na	na	The site contained no buildings at the time of purchase.	
IEQ-7	Internal Noise Levels	na	na	As 'open air mall' areas make up more than 95% of the project's total common areas, this credit is 'Not Applicable' and is excluded from the points available used to calculate the Indoor Environment Quality Category Score.	Requires engagement of acoustics consultant and potentially additional acoustic treatments.
IEQ-8	VOCs	3	3	95% of all internal painted surfaces meet the Total Volatile Organic Compound (TVOC) Content Limits or where no paint is used in the project. 95% of all adhesives and sealants meet the TVOC Content Limits or where no adhesives or sealants are used. All carpets meet the TVOC emissions limits or no carpet has been installed in the project and projects wish to use low-VOC flooring, all the flooring installed in the project meet the emissions limits.	High level of contractor monitoring to implement at construction stage. No cost penalty generally in the industry for compliant products. To be applied to all base building and requirements identified for tenancies. Confirmed 18/12/13.
IEQ-9	Formaldehyde Minimisation	1	1	All engineered wood products (including exposed and concealed applications) either: have low formaldehyde emissions; or, contain no formaldehyde.	High level of contractor monitoring to implement at construction stage. No cost penalty generally in the industry for compliant products. To be applied to all base building and requirements identified for tenancies. Confirmed 18/12/13.
IEQ-10	Mould Prevention	1	0	The mechanically air-conditioned ventilation system actively controls humidity to be no more than 60% relative humidity in the space and no more than 80% relative humidity in the supply ductwork.	Not targeted.
Sub-Total		6	5		
Weighted Sub-Total		12.0	10.0		
<b>Energy</b>					

## SOPA Ferry Wharf - Green Star Retail Centre Scorecard



**Version: v001 - Date: 04/02/2014 - Tool: Green Star Retail Centre v1 - Prepared by: SR**

**Important Definitions:** Gross Lettable Area (GLA) = The floor space contained within a tenancy at each floor level as defined in Section 3 of the PCA's 'Method of Measurement for Lettable Area'. Gross Floor Area (GFA) = The total floor area of all parts of the building that are permanently covered and can be protected from the elements. Car parking is not included in the GFA.

**Eligibility:** We note that the proposed retail development is not eligible for formal rating under the Green Star Retail Centre v1 Rating Tool. This Scorecard is to be used for the purposes of an informal aspirational rating only, to ensure the inclusion of sustainability design initiatives in accordance with the Green Star framework. The project does not meet the Spatial Differentiation or the Space Use Eligibility Criteria for the following reasons: the retail centre is a project component and not distinct from the development as a whole; and, there are no common conditioned mall areas.

Credit	Credit Name	Available	Targeted	Credit Approach	Comments
ENE-1	Greenhouse Gas Emissions	20	5	The building's predicted greenhouse gas emissions will show a 25% improvement over the predicted greenhouse gas emissions of the 'Benchmark Building'.	The base building's predicted greenhouse gas emissions will show a 35% improvement over the predicted greenhouse gas emissions of a BCA Section J compliant building. Energy efficiency initiatives proposed include: highly efficient building fabric; highly efficient central plant; natural ventilation throughout common areas; daylight harvesting and high efficient low maintenance lighting in common areas. Requires a building simulation, can be undertaken in parallel with the energy simulation as per ENE-1. Additional scope for an energy consultant - Northrop Sustainability can provide these services. Confirmed 18/12/13.
ENE-2	Energy Sub-metering	2	2	Sub-metering is provided for all substantive energy uses within the building (i.e. all energy uses of 100kVA or greater) and there is an effective mechanism for monitoring energy consumption data from all sub-meters. An additional point is provided where the above point is achieved, sub-metering is provided for each tenancy, and there is an effective mechanism for monitoring energy consumption data from all sub-meters.	BMS is to include Base Building Retail Centre services. Retail tenancies to be metered. Confirmed 18/12/13.
ENE-3	Peak Energy Demand Reduction	2	0	Peak energy demand is actively reduced by 15% (for one point) 30% (for two points); OR A fatter demand curve is achieved, i.e. the difference between the peak and average demand does not exceed 40% (for one point) or 20% (for two points).	Not targeted.
ENE-6	Car Park Ventilation	3	0	For one point: 50% of the total enclosed/semi-enclosed car park has either passive supply or passive exhaust. For two points: 100% of the total enclosed/semi-enclosed car park has either passive supply or passive exhaust. For three points: 100% of the total enclosed/semi-enclosed car park has either passive supply or passive exhaust and the car park mechanical ventilation fans include variable-speed drives controlled by carbon monoxide monitoring.	In order to target this credit, 100% of the retail car park must be provided with passive supply. Not possible with proposed design. Not targeted.
Sub-Total		27	7		
Weighted Sub-Total		24.0	6.2		
<b>Transport</b>					
TRA-1	Provision of Car Parking	2	0	The number of car parking spaces is no more than 10% (one point) or no more (two points) than the minimum local planning allowances or at least 25% (one point) / 50% (two points) less than the maximum local planning allowances.	Not targeted.
TRA-2	Fuel Efficient Transport	1	0	A minimum of 25% of the total parking spaces on the site are designed and labelled for small cars in accordance with AS/NZS 2890.1:2004 (i.e. maximum 2.3m wide x 5.0m long), and/or mopeds/motorbikes. A minimum of 10% of parking spaces must be for small cars (rather than mopeds/motorbikes); and a minimum of 10% of the total preferred parking spaces (i.e. located near the entrance) must be dedicated solely for use by small cars and/or mopeds/motorbikes.	We assume this is not desired due to the impact on car parking. Not targeted.
TRA-3	Cyclist Facilities	3	3	Cyclist facilities are provided for 5% (one point) or 10% (two points) of building staff; and visitor bicycle storage is provided within 50m of a major public entrance and meets the following criteria: One space per 500m <sup>2</sup> of GLA for centres less than 30,000m <sup>2</sup> (three points).	Minimum of 8 visitor cycle parking spaces based on approximately 3,722m <sup>2</sup> GLA. Two showers to be provided for staff.
TRA-4	Commuting Mass Transport	5	5	Points are awarded for the quality of mass transport options available to building users, as determined using the Green Star Mass Transport Calculator.	Site is in close proximity to mass public transport.
TRA-5	Trip Reduction Mixed Use	1	1	Medium-to high-density residential development(s) are located within 250m of the retail centre: Density of the residential development(s) is an average of >25 units per hectare; and There are dedicated pathways and cycle lanes for pedestrians and cyclists between the retail centre and residential development(s).	There is medium-to-high density residential development above the retail centre, with dedicated bicycle parking.
Sub-Total		12	9		
Weighted Sub-Total		8.0	6.0		
<b>Water</b>					
WAT-1	Occupant Amenity Water	10	4	The predicted potable water consumption for sanitary use within the building has been reduced by 40% against a 'best practice' benchmark.	Highest WELS fixtures and fittings will be installed. Rainwater reuse is proposed for irrigation within the mall common areas.
WAT-2	Water Meters	3	3	Water meters are installed for all major water uses in the development; and It is demonstrated that a Building Management System (BMS) is linked to the water meters and is able to perform as a leak detection system. Major water uses are considered to be: bathrooms; evaporative heat rejection systems; fire system water; irrigation systems; rainwater supply; recycled water supply; car wash facilities; food preparation facilities; major tenants; and wash down systems.	Water meters will be provided to all major uses in retail, including major tenants. Minor tenants will be provided with individual water utility meters, and will pay water bills directly to the water utility.
WAT-3	Landscape Irrigation	1	1	Potable water consumption for landscape irrigation has been reduced by 90%	May be achieved through recycled water and efficient systems and drought resistant plantings in retail area.
WAT-4	Heat Rejection Water	8	0	Potable water consumption of water-based heat rejection systems is reduced by 50% (four points) or 90% (eight points).	Efficiency achieved through a water efficient water based base building heat rejection system. Not targeted. TBC during detailed design.
WAT-5	Fire System Water	1	0	There is sufficient temporary storage for a minimum of 80% of the routine fire protection system test water and maintenance drain-downs, for re-use on-site; and each floor fitted with a sprinkler system has isolation valves or shut-off points for floor-by-floor testing.	Note, sprinkler drain water may not be suitable for re-use, sprinklers and sprinkler pipe drain-down water can be excluded from this credit. May require additional storage and treatment measures. May be integrated to whole project system. TBC in detailed design.
Sub-Total		23	8		
Weighted Sub-Total		19.0	6.6		
<b>Materials</b>					
MAT-1	Recycling Waste Storage	3	3	A dedicated storage area for the separation and collection of recyclables from tenancies and common areas is provided and it: Is adequately sized to handle the recyclable waste streams specified in the Compliance Requirements; Includes a holding area for items of re-use; Meets the access requirements of 'Policy for Waste Minimisation in New Developments' (NSW, 2004); Section A, points A12 through A17; and Section C, points C14 and C15. Is separate from, but adjacent to, general waste facilities; Is located in the same level as the loading dock with a clearly marked, sign-posted, convenient and guaranteed access route which allows: Level access from tenancies (or goods lifts are provided); and avoids the need for manual handling of the waste.	May involve some additional space requirements in waste storage. Confirmed 18/12/13.
MAT-2	Building Reuse	NA	NA	The site contained no buildings at the time of purchase.	
MAT-3	Recycled Content & Reused Products & Materials	3	0	At least 2% (for one point) of the project's total contract value is represented by re-used products/materials. 1% (for one point) or 2% (for two points) of the project's total value is represented by materials for base building construction which have a post-consumer recycled content of at least 50%.	This is a high cost or difficult item to target.

## SOPA Ferry Wharf - Green Star Retail Centre Scorecard



**Version: v001 - Date: 04/02/2014 - Tool: Green Star Retail Centre v1 - Prepared by: SR**

**Important Definitions:** Gross Lettable Area (GLA) = The floor space contained within a tenancy at each floor level as defined in Section 3 of the PCA's 'Method of Measurement for Lettable Area'. Gross Floor Area (GFA) = The total floor area of all parts of the building that are permanently covered and can be protected from the elements. Car parking is not included in the GFA.

**Eligibility:** We note that the proposed retail development is not eligible for formal rating under the Green Star Retail Centre v1 Rating Tool. This Scorecard is to be used for the purposes of an informal aspirational rating only, to ensure the inclusion of sustainability design initiatives in accordance with the Green Star framework. The project does not meet the Spatial Differentiation or the Space Use Eligibility Criteria for the following reasons: the retail centre is a project component and not distinct from the development as a whole; and, there are no common conditioned mall areas.

Credit	Credit Name	Available	Targeted	Credit Approach	Comments
MAT-4	Concrete	3	2	Reduction of Portland cement by 30% (two points) or 40% (three points) measured by mass across all concrete used in the project compared to the Green Star reference case. The mix water for all concrete used in the project contains at least 50% captured or reclaimed water (measured across all concrete mixes in the project), and one of the following criteria is met: - At least 40% of coarse aggregate in the concrete is crushed slag aggregate or another alternative materials (measured by mass across all concrete mixes in the project), provided that use of such materials does not increase the use of Portland cement by over five kilograms per cubic meter of concrete; or, - At least 25% of fine aggregate (sand) inputs in the concrete are manufactured sand or other alternative materials (measured by mass across all concrete mixes in the project), provided that use of such materials does not increase the use of Portland cement by over five kilograms per cubic meter of concrete.	We have had recent feedback from other projects with concerns about cracking in compliant concrete mixes. This may be an issue where polished concrete floors are planned. Some cost penalty for compliant materials. Some time penalties for using compliant products - curing time. Cofnirmed 18/12/13.
MAT-5	Steel	2	1	All structural and reinforcing steel to be manufactured by a responsible steel maker, and where reinforcing steel comprises 60% or more of the total steel used in the structure of the building: at least 95% or reinforcing bar and mesh must meet or exceed a 500 MPa strength grade; and, at least 60% must be produced using energy reducing processes in its manufacture.	Achieving 15% of reinforcing steel manufactured using optimal off site practices is difficult. Not targeted. No cost penalty generally in the industry for compliant products.
MAT-6	PVC	2	2	At least 90% of the common uses of PVC products in buildings by cost must meet Best Practice Guidelines for PVC in the Built Environment, or do not contain PVC.	High level of contractor monitoring. No cost penalty generally in the industry for compliant products.
MAT-7	Sustainable Timber	1	0	95% (by cost) of all timber used in the building and construction works is certified under FSC International and/or PEFC accredited certifications schemes or is from a reused source; or is sourced from a combination of both.	This can be an expensive credit to target, and is not commonly targeted in the industry. Includes formwork and hoardings, structural and non-structural timber, cladding, finishes, joinery and furniture items. Not targeted.
MAT-8	Design for Disassembly	1	0	50% (by area) of the structural framing, roofing, and façade cladding systems are designed for disassembly; OR 95% of the total façade is designed for disassembly.	This point may be targeted through curtain wall façade design. Not currently targeted.
MAT-9	Dematerialisation	1	0	At least 50% of the nominated area is framed in structural steel, and where it is demonstrated that the building's structural requirements and integrity have been achieved using 20% less steel (by mass) than in a structure with conventional steel framing, without changing the load path to other structural components; OR Where any two dematerialisation initiatives below are demonstrated: Structure: At least 50% of the nominated area is framed in structural steel, and where it is demonstrated that the building's structural requirements and integrity have been achieved using 10% less steel (by mass) than in a structure with conventional steel framing, without changing the load path to other structural components. Ductwork: the building is fully naturally ventilated, or 95% of the ductwork has been reduced by 95%. Finishes: 95% of all base building flooring or ceilings to be exposed with no covering, or 95% requirement for all base building ceilings to be exposed with no covering. Cladding: 25% of the roof or facade cladding area has a dual function (e.g. roof garden or PV). Piping: All urinals are water free.	Not targeted.
Sub-Total		16	8		
Weighted Sub-Total		10.0	5.0		
<b>Land Use and Ecology</b>					
ECO-	Conditional Requirement	-	-	Site is not located on prime agricultural land, land containing old growth forest. The site is not located within 100 metres of a wetland.	
ECO-1	Topsoil	1	0	All topsoil impacted by the construction works is separated and protected from degradation, erosion or mixing with fill or waste.	Likely to impose significant spatial constraints for the contractor during construction.
ECO-2	Re-use of Land	1	0	75% of the site was Previously Developed Land at the date of site purchase.	The site wasn't previously built on at the date of site purchase.
ECO-3	Reclaimed Contaminated Land	2	0	The site contained Significant Contamination; and the developer/owner has undertaken remedial steps to decontaminate the site prior to construction.	
ECO-4	Change of Ecological Value	4	1	For Greenfield sites, the site has no threatened or vulnerable species and for re-used sites (e.g. refurbishments), such species are protected if present; There is no net reduction of native vegetation cover; and The ecological value of the site is either not diminished, or is enhanced beyond its previously existing state. The points are determined by the Green Star Change in Ecology Calculator on the basis of comparison between the 'before' and 'after' ecological value of the site.	No additional measures required to achieve one point.
Sub-Total		8	1		
Weighted Sub-Total		9.0	1.1		
<b>Emissions</b>					
EMI-1	Refrigerant ODP	1	1	All HVAC refrigerants have an Ozone Depleting Potential (ODP) of zero.	Industry standard.
EMI-2	Refrigerant GWP	2	0	All fluorocarbon refrigerant charge has been replaced with refrigerant(s) that have a Global Warming Potential (GWP100) of 10 or less.	Low GWP refrigerant is used for trigen however no trigen proposed. High cost involved in compliant products.
EMI-3	Refrigerant Leaks	2	1	HVAC Systems containing refrigerants are contained in a moderately airtight enclosure; and a refrigerant leak detection system is installed to cover high-risk parts of the plant.	Refrigerant capture and containment not included due to cost.
EMI-4	Insulant ODP	1	1	All thermal insulants in the project avoid the use of ozone-depleting substances in both its manufacture and composition.	Industry standard.
EMI-5	Stormwater	3	2	The post-development peak 2 year Average Recurrence Interval (ARI) event discharge from the site does not exceed the pre-development peak 2 year ARI event discharge; and all stormwater discharged from site meets the Pollution Reduction Targets in Column B of Green Star Table Emi-5.1.	Requires proprietary stormwater treatment device.
EMI-6	Discharge to Sewer	4	1	The building outflows to the sewerage system due to building occupants' usage have been reduced by more than 30% against an average-practice benchmark. Note: Assumes no black water treatment system.	Highest WELS fixtures and fittings will be installed. No additional measures to WAT-1 required.
EMI-7	Light Pollution	1	1	The lighting design complies with AS 4282 'Control of the Obtrusive Effects of Outdoor Lighting', and relative to its particular mounting orientation, no external luminaire has an Upward Light Output Ratio that exceeds 5%.	Industry standard.
EMI-8	Legionella	1	1	There are no water based heat rejection systems.	Not targeted.
Sub-Total		15	8		
Weighted Sub-Total		8.0	4.3		
<b>Total Green Star Points (weighted)</b>		<b>Available Points</b>	<b>Targeted Points</b>		
		100.0	47.9	Require 45 points to achieve a 4 star rating + a recommended buffer.	